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RFID Pilot Project – An Efficient way to Perform Chemical Inventories

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RFID Pilot Project Overview

- Material Physics and Application (MPA) initiated a pilot project using a Radio Frequency Identification (RFID) Scanner and RFID barcodes for tracking and performing annual chemical inventories.
- An RFID Scanner and an Optical Scanner were both used to perform an inventory of 50 chemicals:
 - Comparisons between the two methods were made on accuracy and scanning time, and
 - Pros and cons of the two methods were documented.
- Initial results showed that using RFID scanners and barcodes will significantly improve efficiency compared to optical scanners.

Note: Optical scanners are current the method used by LANL to perform Annual Chemical Inventories.

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RFID Pilot Project Details

- The RFID barcodes used were passive not active – Meaning they are only active when the scanner is communicating with them.
- The following are examples of RFID barcodes:



- The scanner used was a Motorola MC3190-Z:
 - It has Bluetooth and WiFi technology that can be disabled in restricted areas, and
 - It can give you real-time updates by downloading data to the ChemDB database while you are scanning chemical container barcodes.



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RFID Pilot Project Details Continued

To initiate the Pilot, RFID barcodes were placed on 50 chemical containers located in three different locations:

1. Inside a wall mounted Chemical Storage Cabinet
2. In a Flammable Liquid Storage Cabinet
3. Under a Chemical Fume Hood



Wall Mounted
Cabinet



Flammable Liquid Storage Cabinet



Under Chemical Fume Hood

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RFID Pilot Project Details Continued

The actual inventories were performed by 5 different individuals (e.g., student, postdoc, technologist, staff scientist) and the results were averaged.

- Individuals performing the inventories had not used the optical reader nor the RFID reader before the Pilot.
- Individuals using the Optical Scanner wore latex gloves for scanning and had to pick up the chemicals to position them so the scanner could read the barcode.
- Individuals using the RFID Scanner did not need to touch the chemicals.

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RFID Pilot Project - Initial Results

- Use of the Optical Scanner and the RFID Scanner result in the **same level of accuracy** – approximately 85%.
- Using the RFID Scanner is on average **4 times faster** than the using the Optical Scanner
- Using RFID technology **minimizes the need to handle or touch hazardous chemicals**.
- Using the RFID Scanner would **reduce T&E by at least half** because it can be done by **one person and not 2 people**.

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Optical Scanner Pros and Cons

■ Pros

- The lab has this technology in usage.
- No new training is required.
- The reader is not affected by the chemical containers (metal, plastic, glass)



■ Cons

- Old Technology — The software can not be updated or expanded.
- Requires 2 people: one to scan and another to pickup the containers.
- Handling each chemical container increases the risk to personnel who perform the inventory.
- No real-time updates.
- Greater cost in Time & Effort (T&E) for maintaining the chemical inventory.
- Labor intensive to get accuracy higher than 90%.

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RFID Scanner Pros and Cons

■ Pros

- Significant T&E cost-saving.
- Accuracy is the same or better than the optical reader.
- Minimize handling of chemical containers — lower risk.
- Proven technology that has been used at other national labs and in industry.
- One person job for scanning the RFID tags.
- The App can be configured to each group/division needs without having to change the ChemDB database.



■ Cons

- Labor intensive to change over from the optical reader system to the RFID system.
- Training would be required to learn the new RFID reader.
- RFID tags will need to be replaced periodically.
- Chemical segregation may be needed when there are multiple owners in one lab or area.

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RFID Pilot Project – Next Steps

- Install the RFID Scanner Application that will allow data from the RFID Scanner to be down loaded into the ChemDB database.
- Program ChemDB to accept scanned data from the RFID Scanner – 10-15 hours — ChemDB will then be able to accept data from the RFID Scanner or the Optical Scanner
- Next tagging chemicals with RFID tags and testing out the RFID beta ChemDB version.

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Questions?

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